



# **Armed Forces College of Medicine AFCM**



# **Dermatomes & cutaneous nerves of upper & lower limbs**

**Dr. Shereen Adel**

# INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture the student will be able to:

1. Identify dermatomes of shoulder, arm, forearm and hand and their clinical significance.
2. Enumerate cutaneous nerves supplying shoulder, arm & forearm
3. Identify dermatomes of thigh, gluteal region, leg and foot and their clinical significance.
4. Enumerate cutaneous nerves supplying thigh, gluteal region, leg and foot.

## Key points

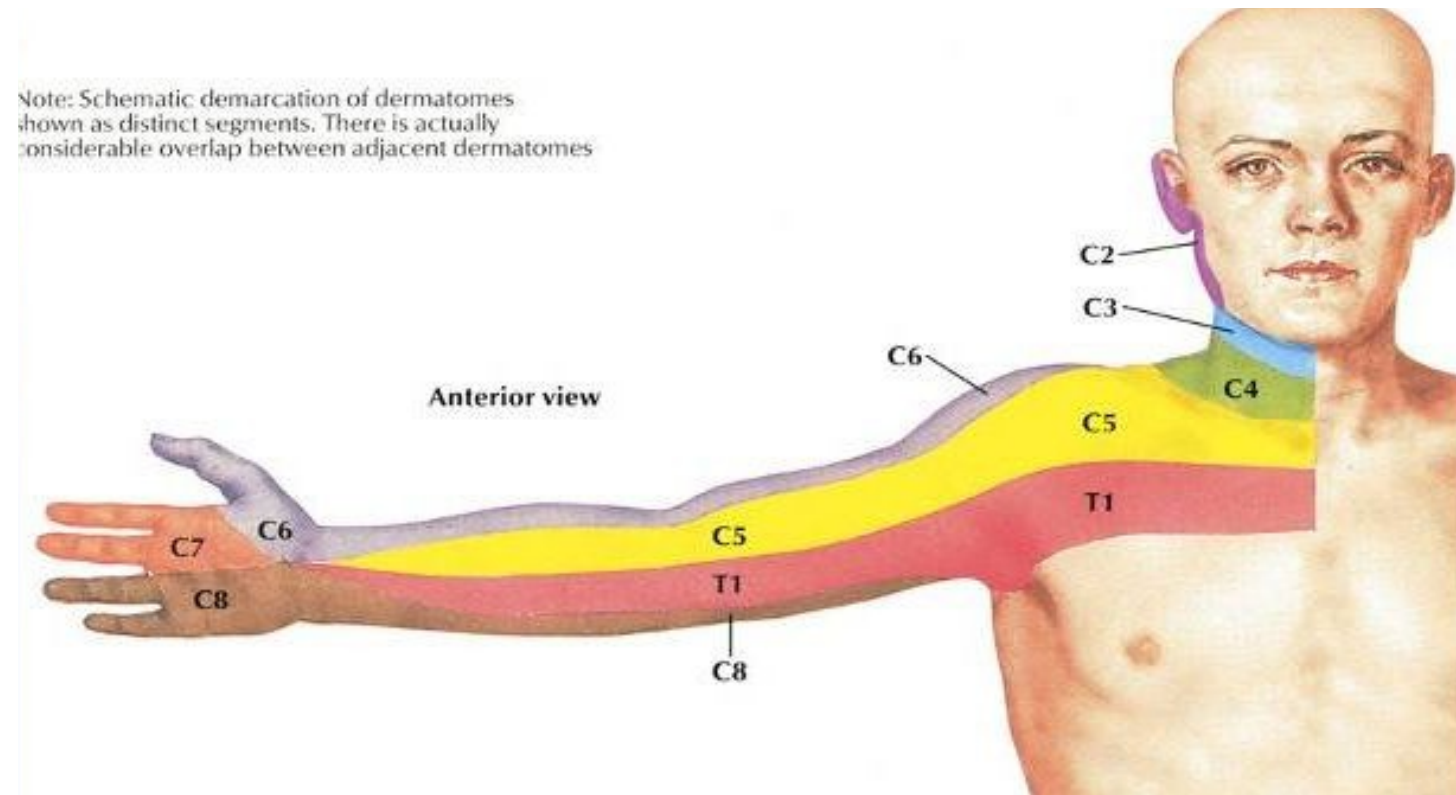


By the end of this lecture the student will be able to:

1. Dermatomes of shoulder, arm, forearm and hand and their clinical significance.
2. Cutaneous nerves supplying shoulder, arm & forearm.
3. Dermatomes of thigh, gluteal region, leg and foot and their clinical significance.
4. Cutaneous nerves supplying thigh, gluteal region, leg and foot.

# Segmental innervation (dermatomes) of the upper limb

- **Definition:**
- Dermatome is the area of the skin developed from a single embryonic somite and supplied by a single spinal nerve.

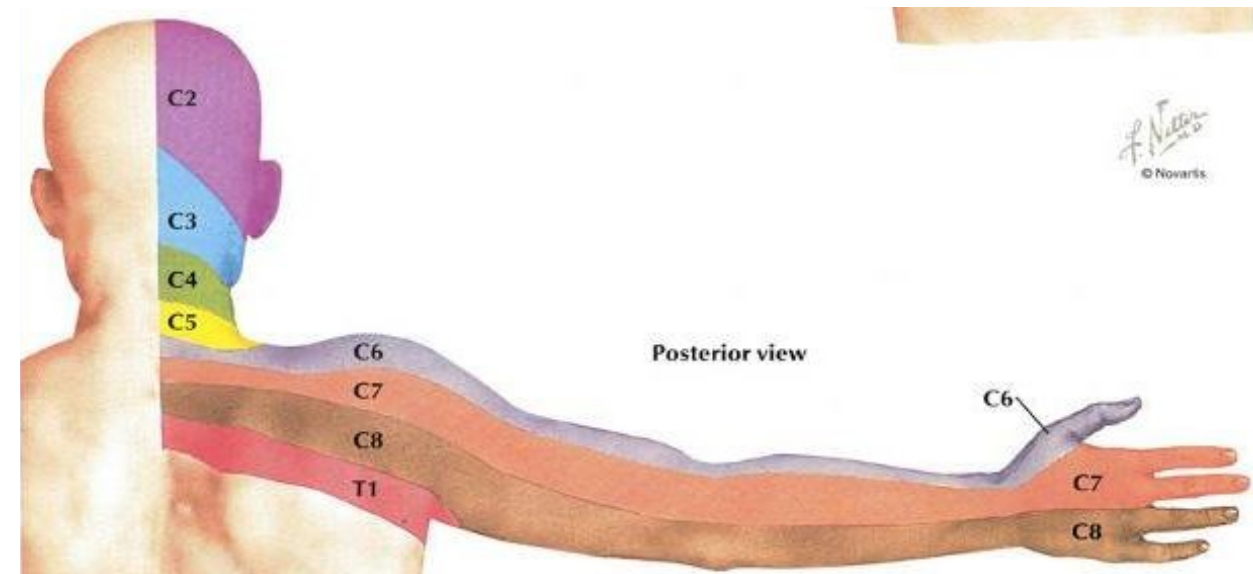


# Segmental innervation (dermatomes) of the upper limb

- An axial line

passes along the midline of the upper limb. The lateral border is called **pre-axial border** and the medial border is called **post-axial border**.

The dermatomes begin along the pre-axial border, then continue along the post-axial border in series.



Frank H. Netter. 4<sup>th</sup> edition

## Lecture Quiz 1 (dermatomes)



Dermatome of little finger is....., middle finger is.....  
& of thumb is.....

Dermatome of lateral aspect of arm & forearm is.....

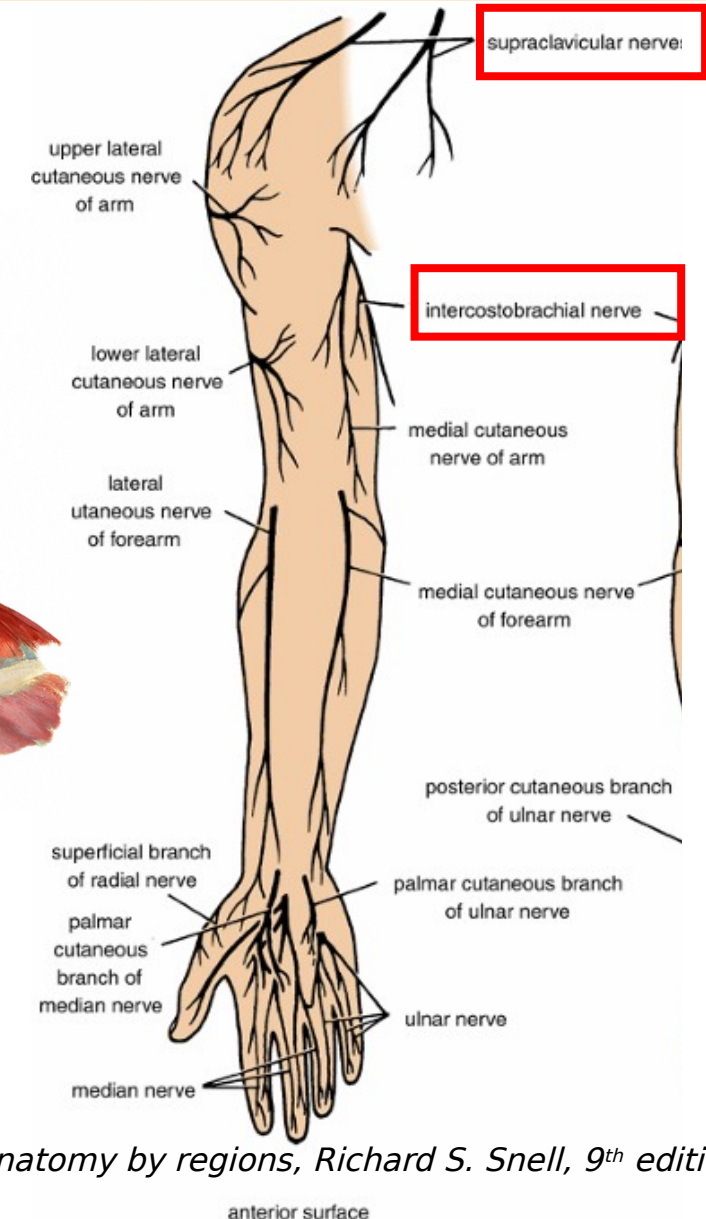
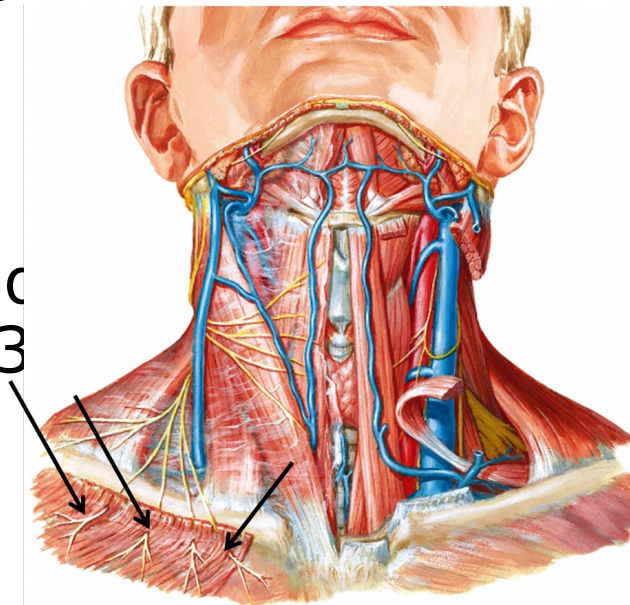


# Cutaneous (sensory) nerve supply of the upper limb



\* The skin of the whole upper limb is supplied by **branches of the brachial plexus** (C5,6,7,8 & T1) except two areas:

- 1. The skin over the point of shoulder, down to upper part ( $\frac{1}{2}$ ) of deltoid:** supplied by supraclavicular nerves (C3, C4) from cervical plexus.
- 2. The skin of the upper part of the medial aspect of the arm and the floor of axilla:** supplied by the intercostobrachial nerve (T2).





## II. Cutaneous Innervation of Arm



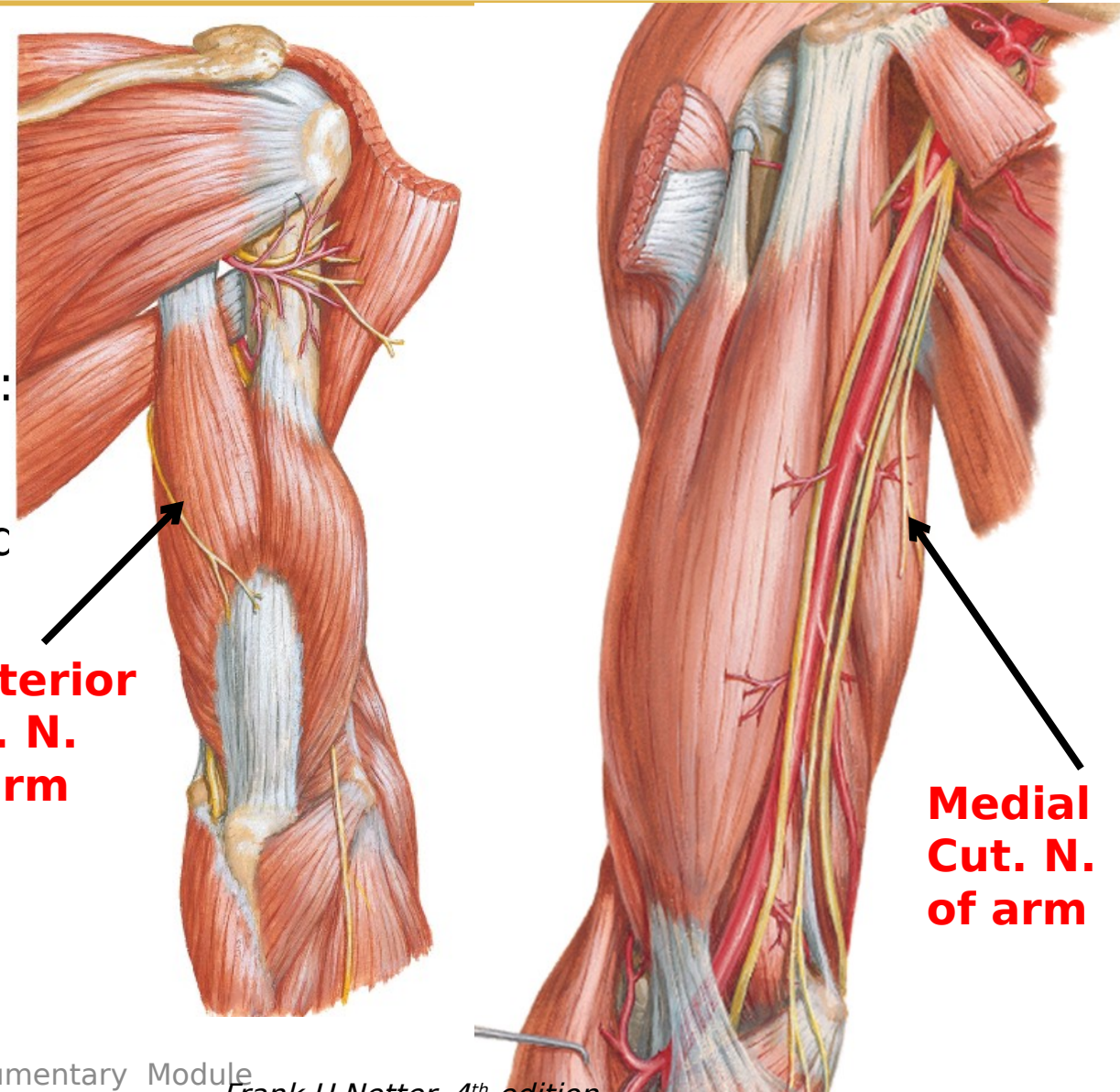
- ONE nerve supplies skin of back of arm:
- **Posterior cut. N. of arm (radial).**

\* TWO nerves supply skin of medial side of arm:

- 1. Intercostobrachial N.** → upper part.
- 2. Med. Cut. N. of arm** → lower part (med. Corac

**Posterior  
Cut. N.  
of arm**

**Medial  
Cut. N.  
of arm**

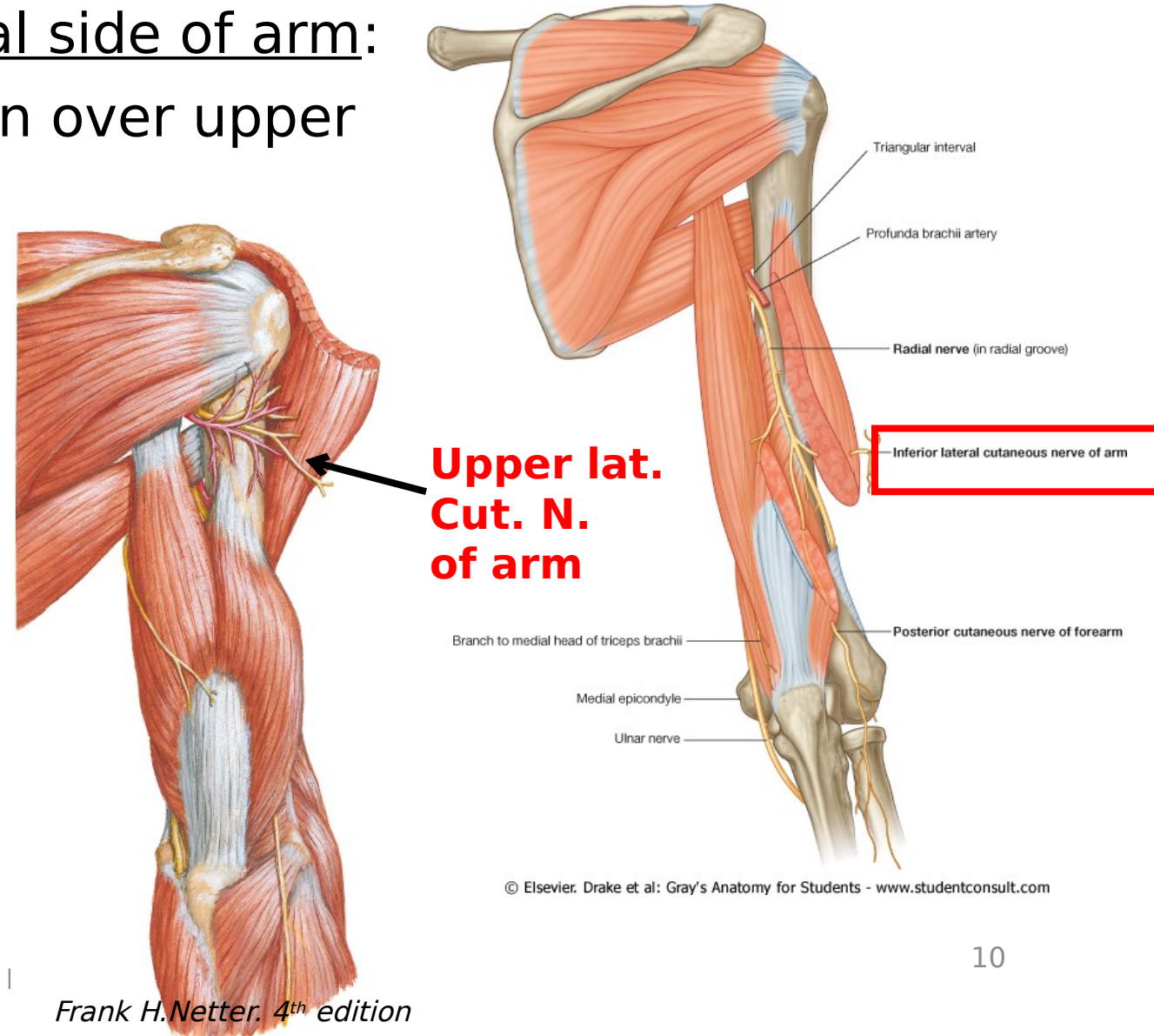


## II. Cutaneous Innervation of Arm



\* THREE nerves supply skin of lateral side of arm:

1. **Lateral supraclavicular N.** → skin over upper  $\frac{1}{2}$  of deltoid.
2. **Upper Lat. Cut. N. of arm** → skin over lower  $\frac{1}{2}$  of deltoid (axillary).
3. **Lower Lat. Cut. N. of arm** → skin below deltoid (radial).



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## Lecture Quiz 2 (cutaneous nerves)

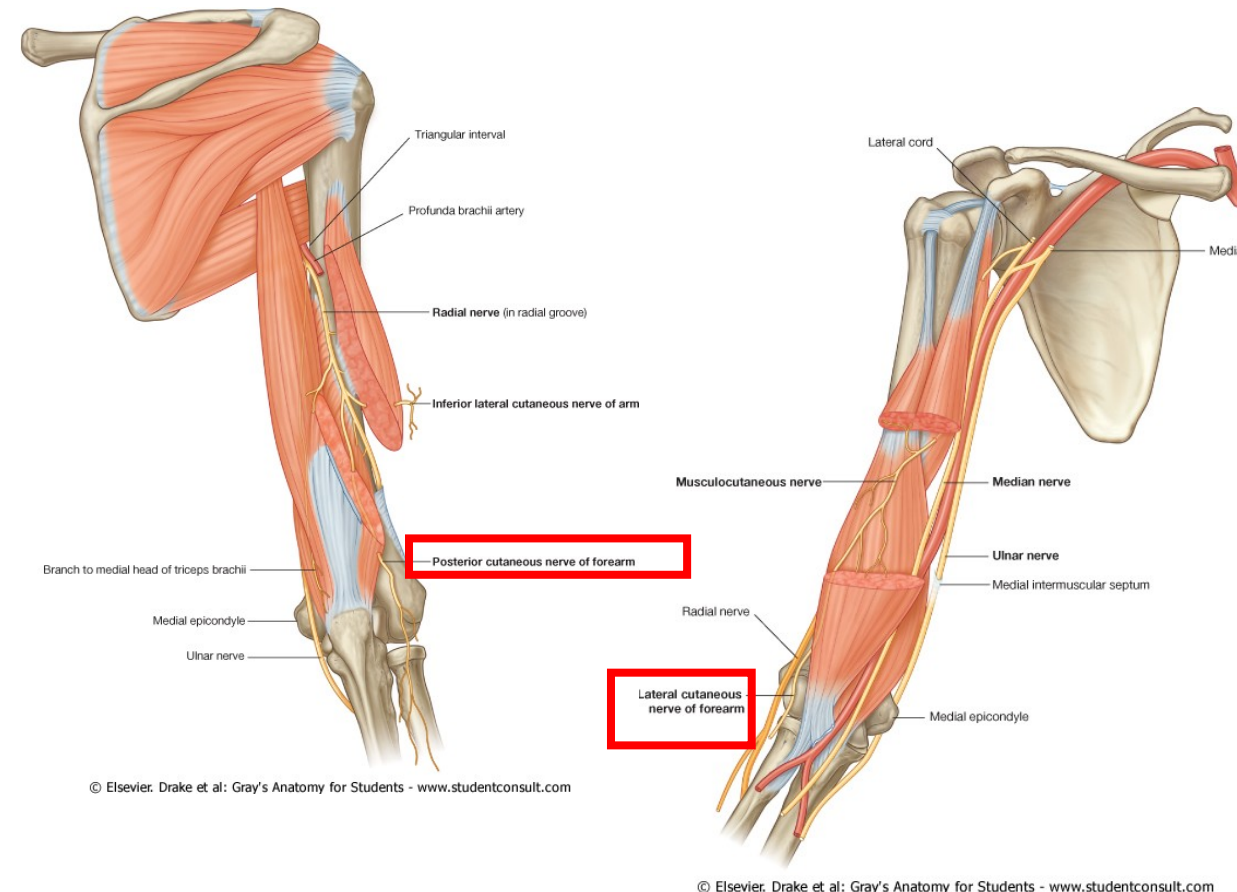


- Cutaneous innervation of arm:
  - 1- Posteriorly.....
  - 2- Medially.....&.....
  - 3- Laterally.....,  
.....&.....

### III. Cutaneous Innervation of Forearm



- \* **ONE nerve** supplies skin of back of forearm: **Posterior cut. N. of forearm (radial).**
- \* **ONE nerve** supplies skin of lat. side of forearm: **Lateral cut. N. of forearm (musculo cut.).**
- \* **ONE nerve** supplies skin of med. side of forearm: **Medial cut. N. of forearm (medial cord).**



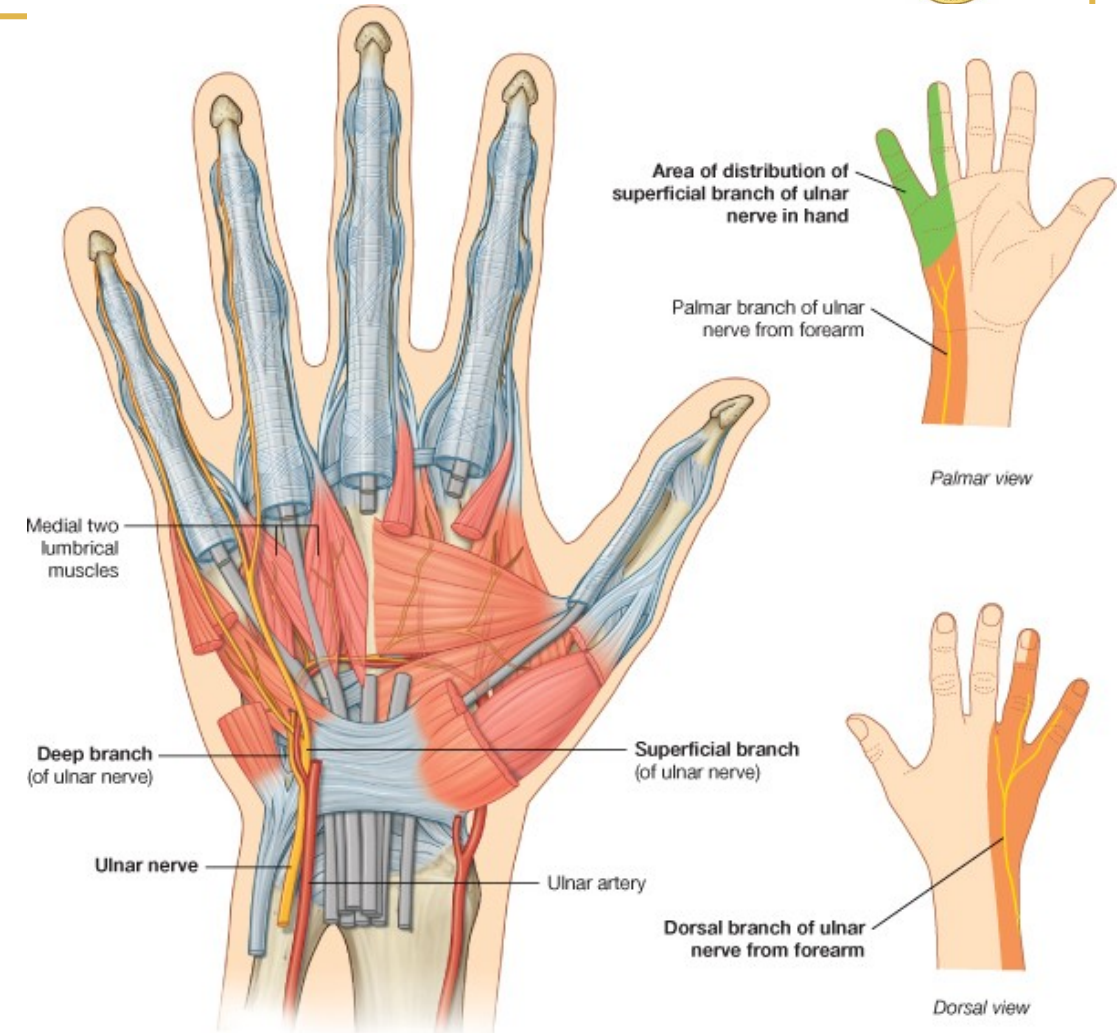


# IV. Cutaneous Innervation of Hand & Fingers



**B. Ulnar N.:** gives:

- 1. Palmar cut. br.** → to skin of med.  $\frac{1}{3}$  of palm.
- 2. Dorsal cut. br.** → to skin of med.  $\frac{1}{3}$  of dorsum & med.  $1\frac{1}{2}$  fingers on dorsum of prox. Phalanges.
- 3. Superficial terminal branch** → to skin of med.  $1\frac{1}{2}$  fingers (except on dorsum of prox. Phalanges).



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# IV. Cutaneous Innervation of Hand & Fingers

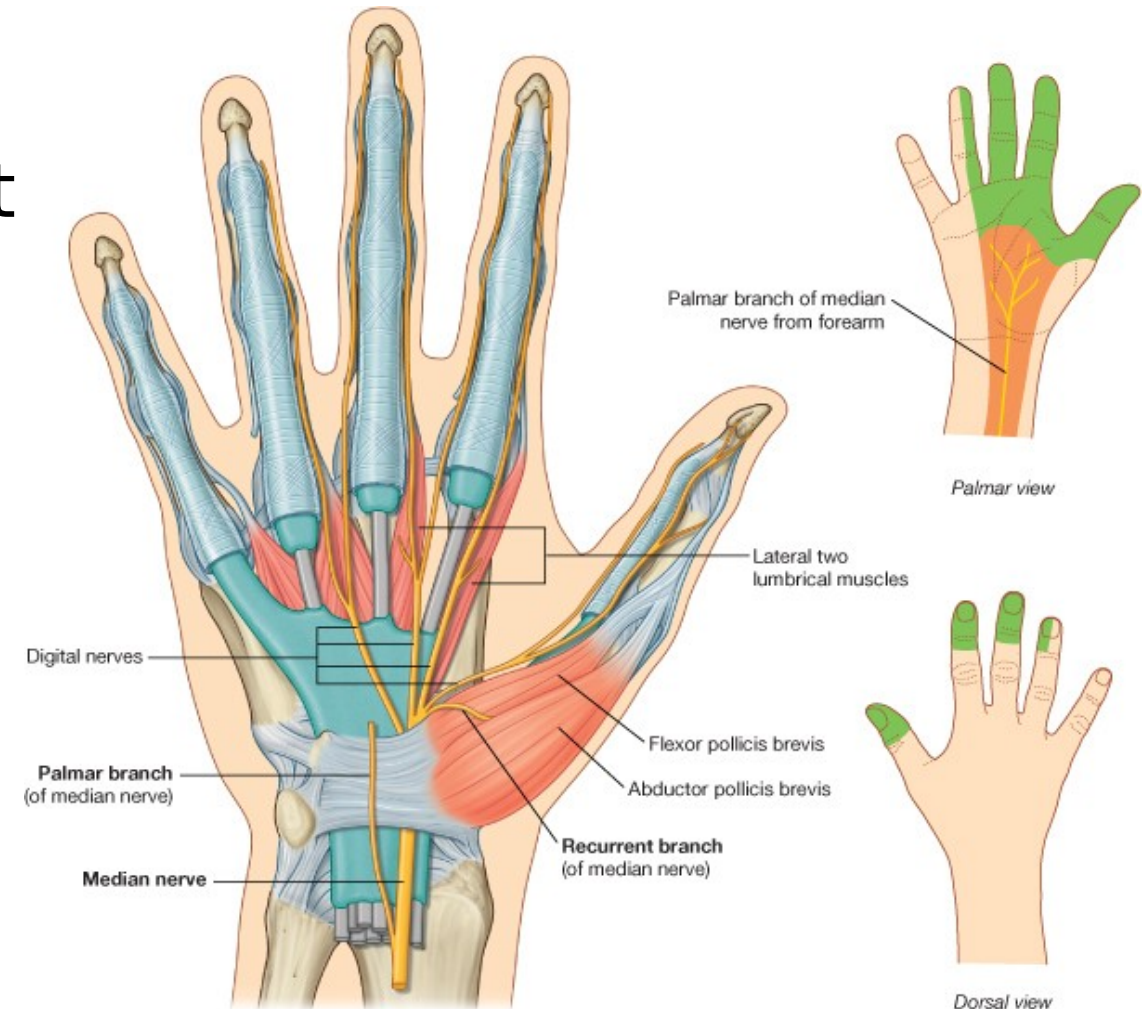


**C. Median N.:** gives:

**1. Palmar cut. br.** → to skin of lat  $\frac{2}{3}$  of palm & distal part of skin over thenar eminence.

**2. 5 palmar digital nerves**

→ to skin of lat.  $3\frac{1}{2}$  fingers (except on dorsum of prox. phalanges).



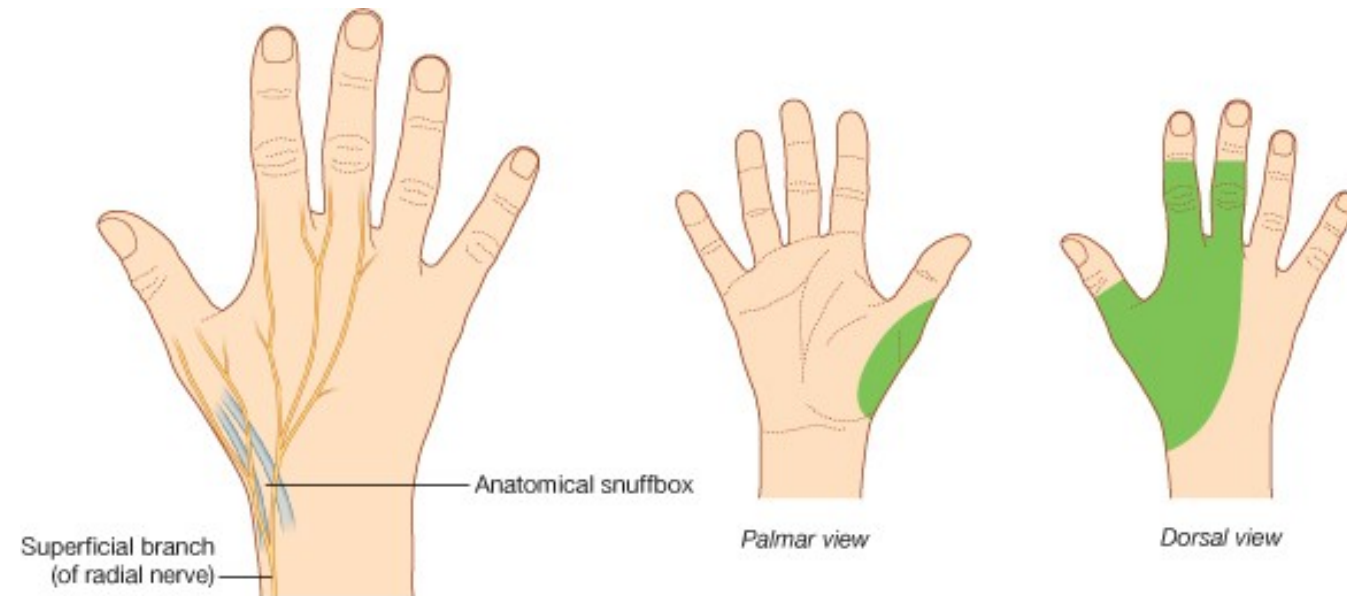
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## IV. Cutaneous Innervation of Hand & Fingers



### D. Superficial branch of Radial N.:

→ to skin of lat.  $\frac{2}{3}$  of dorsum & lat.  $3\frac{1}{2}$  fingers on dorsum of prox. Phalanges.



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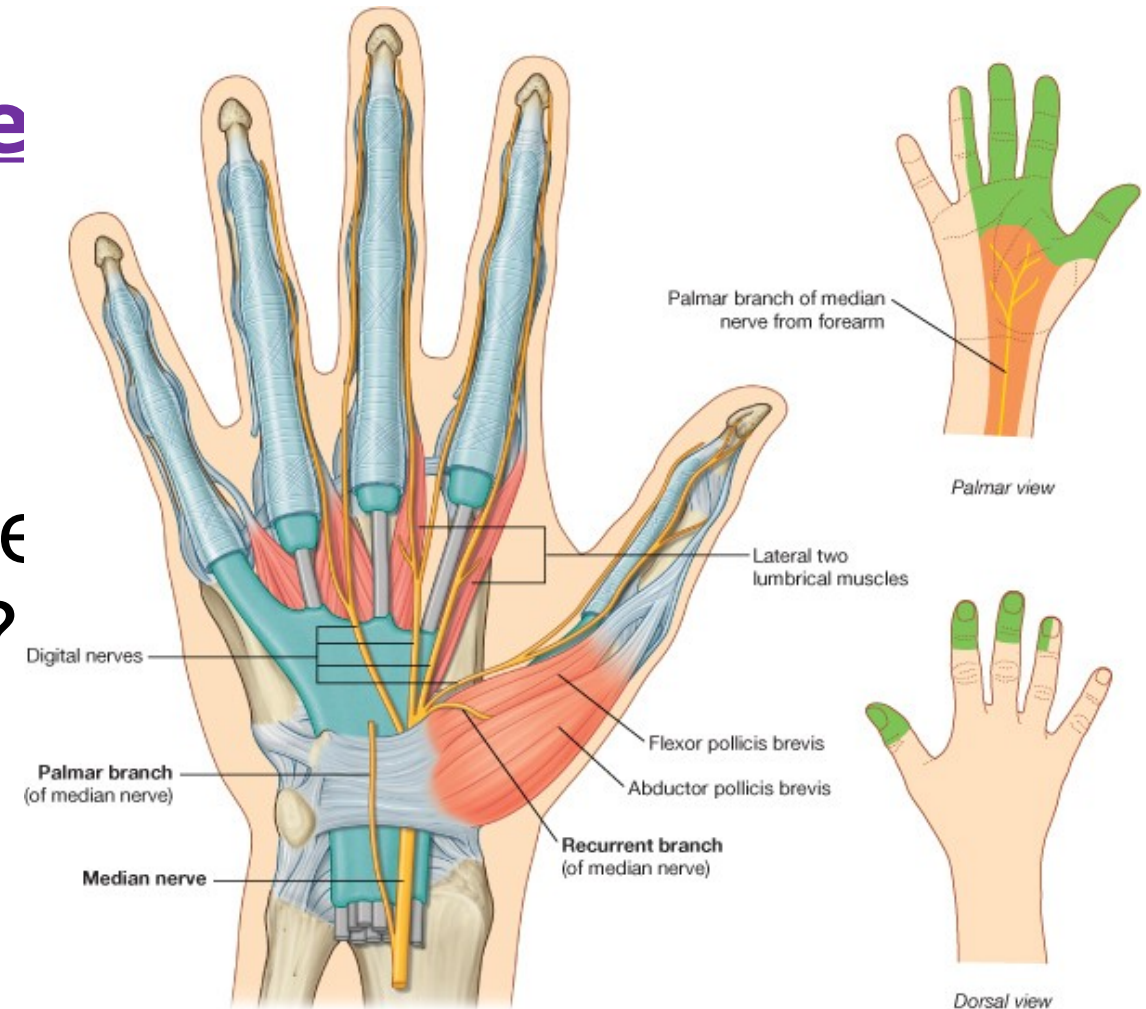


# Lecture Quiz



- In carpal tunnel syndrome
- **severe pain** and **tingling sensation**

occurs in lateral 3 ½ fingers  
But not in the lateral 2/3 of the palm, Why.....?



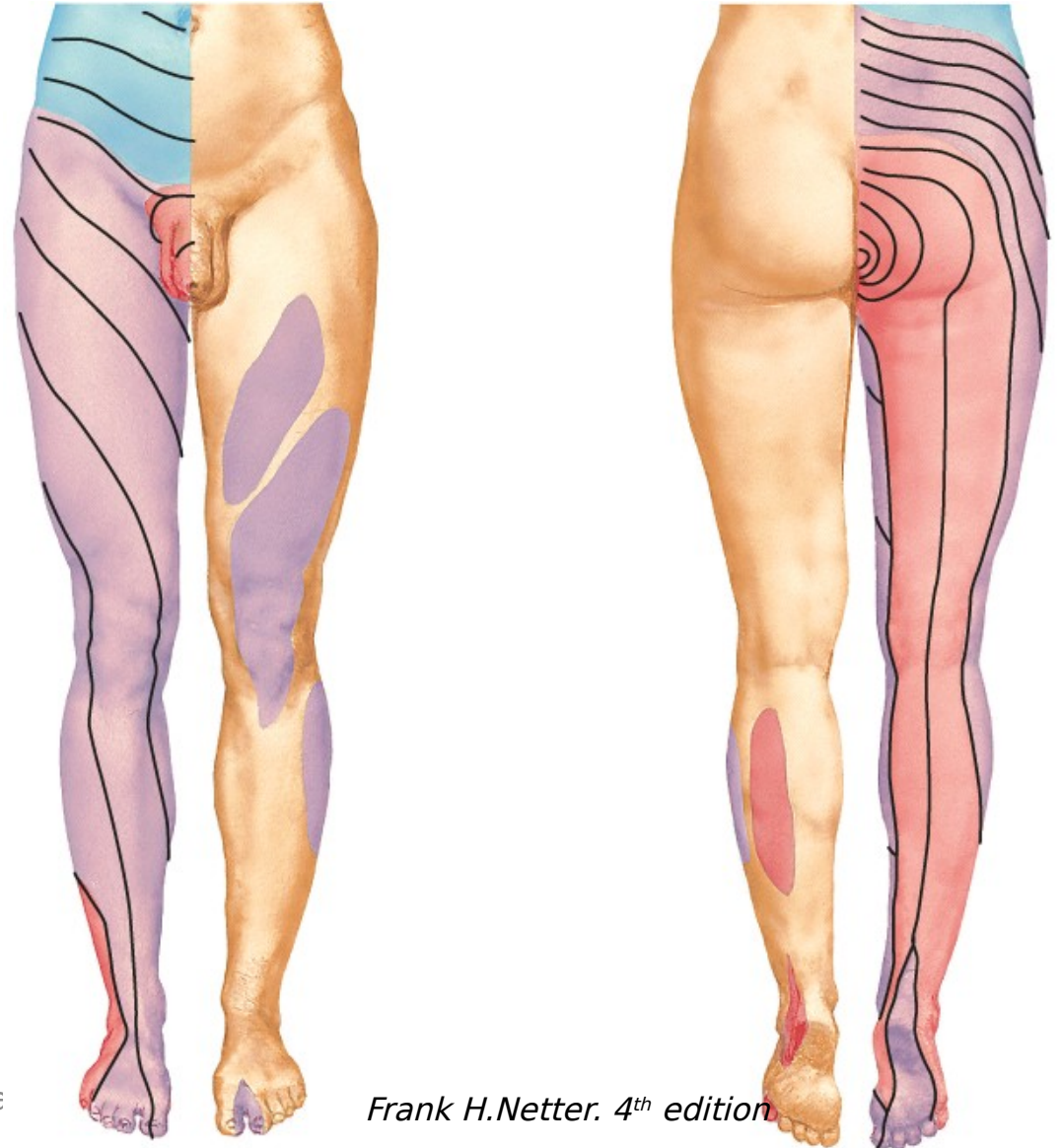
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# Segmental innervation (dermatomes) of the lower limb



- **Definition:**
- Dermatome is the area of the skin developed from a single embryonic somite and supplied by a single spinal nerve.

**To test for nerve root damage, the corresponding dermatome supplied by that nerve root may be tested for abnormal sensation.**

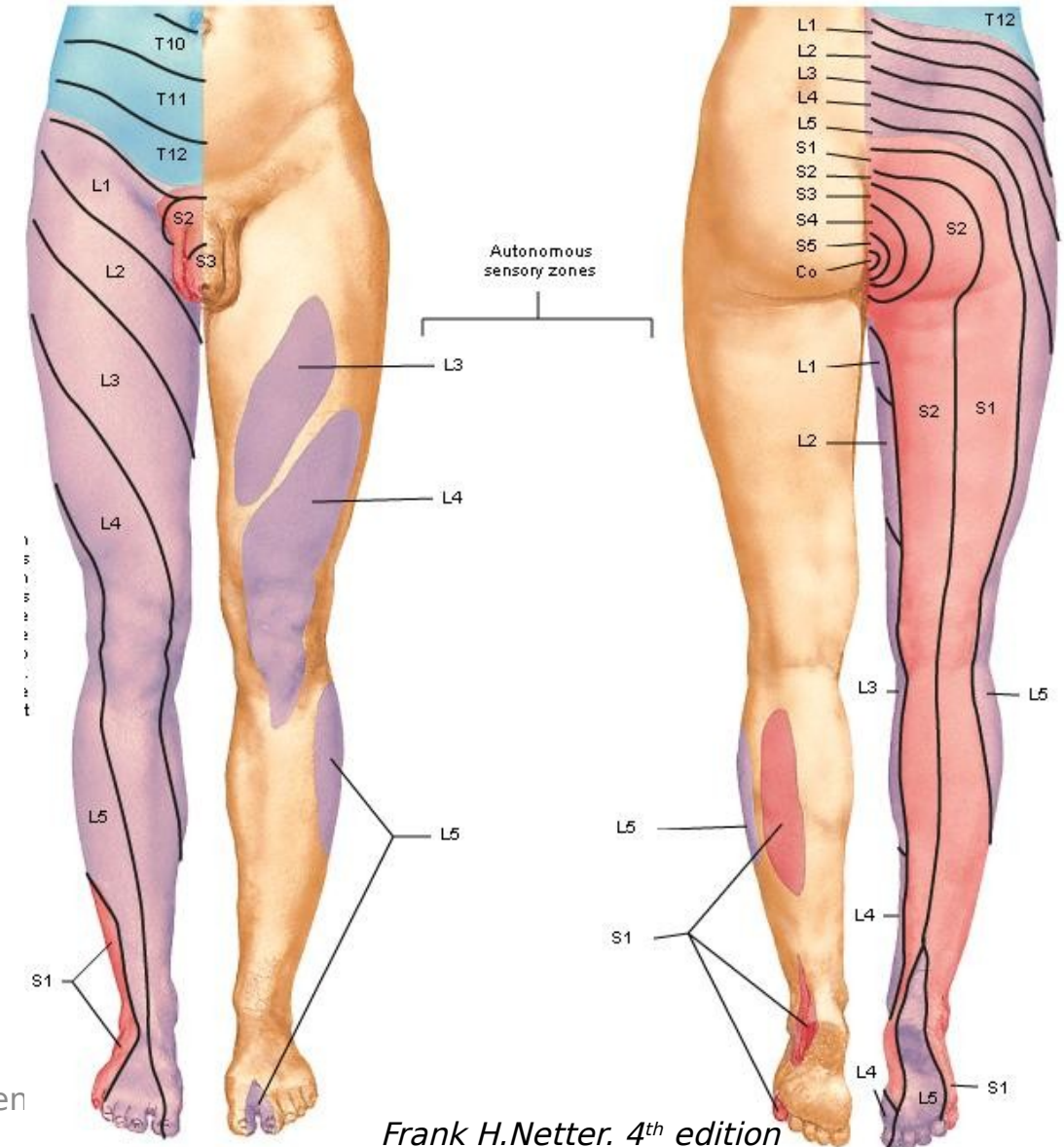


# Segmental innervation (dermatomes) of the lower limb

**NB:**

**The front & sides of the lower limb are supplied by lumbar nerves (L1 to 5)**

**The median area of the back of the limb is supplied by sacral nerves (S1 to 5)**



# Segmental innervation (dermatomes) of the lower limb

**Front of thigh:**

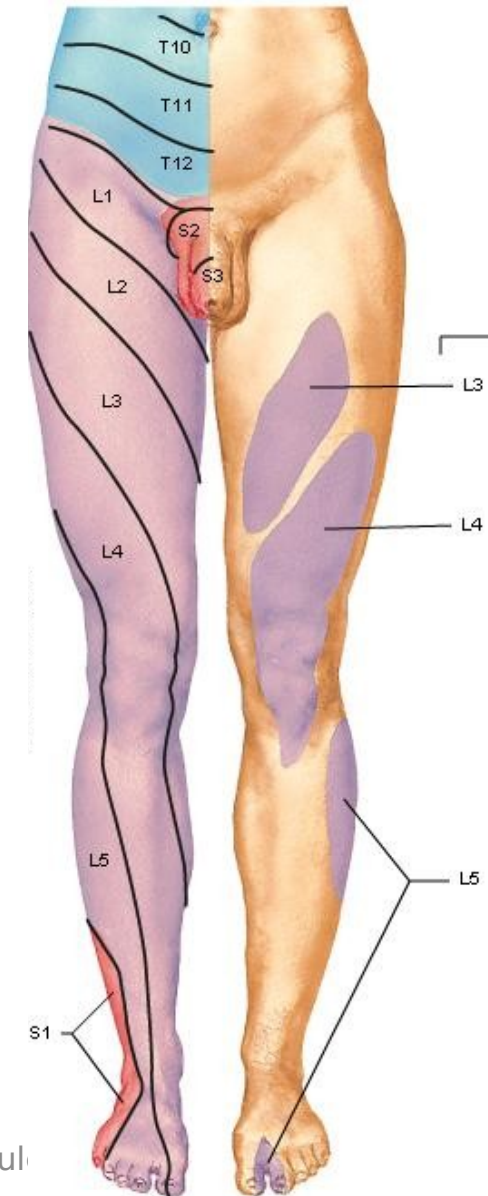
**L1,2 &3** from above downwards.

**Front of leg:**

**L 4 & 5** from medial to lateral.

**Dorsum & sole of foot:**

**L4, 5 &S1** from medial to lateral.





# Segmental innervation (dermatomes) of the lower limb



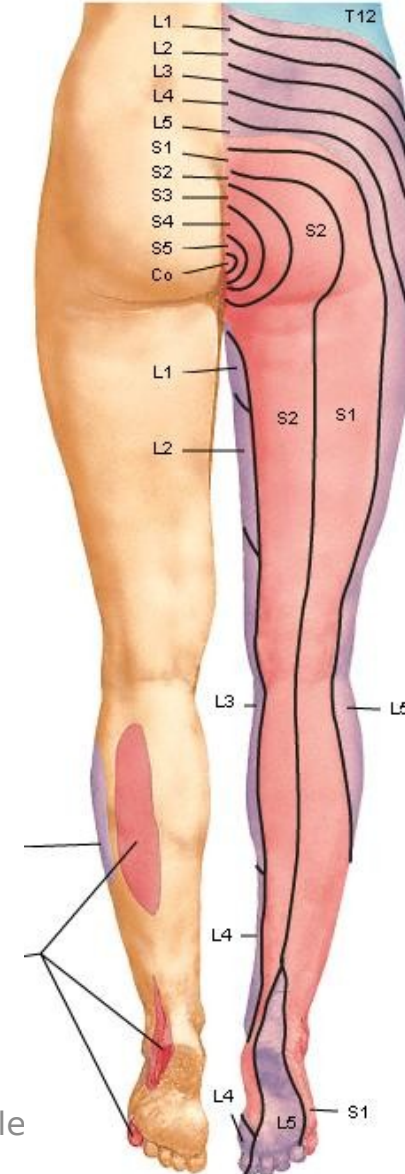
The heel is supplied by **S1**.

## Back of leg & thigh:

**S2** supplies a long vertical strip in midline of back of leg & thigh as far as gluteal fold.

## Gluteal region:

**L2** (lateral area),  
**S3** (middle area)  
**S4** (medial area).



Frank H. Netter. 4<sup>th</sup> edition

## Lecture Quiz1 ( dermatomes)



Regarding segmental nerve supply:

2- Heel is supplied by.....

3- Front of thigh is supplied by.....while front of leg is supplied by.....

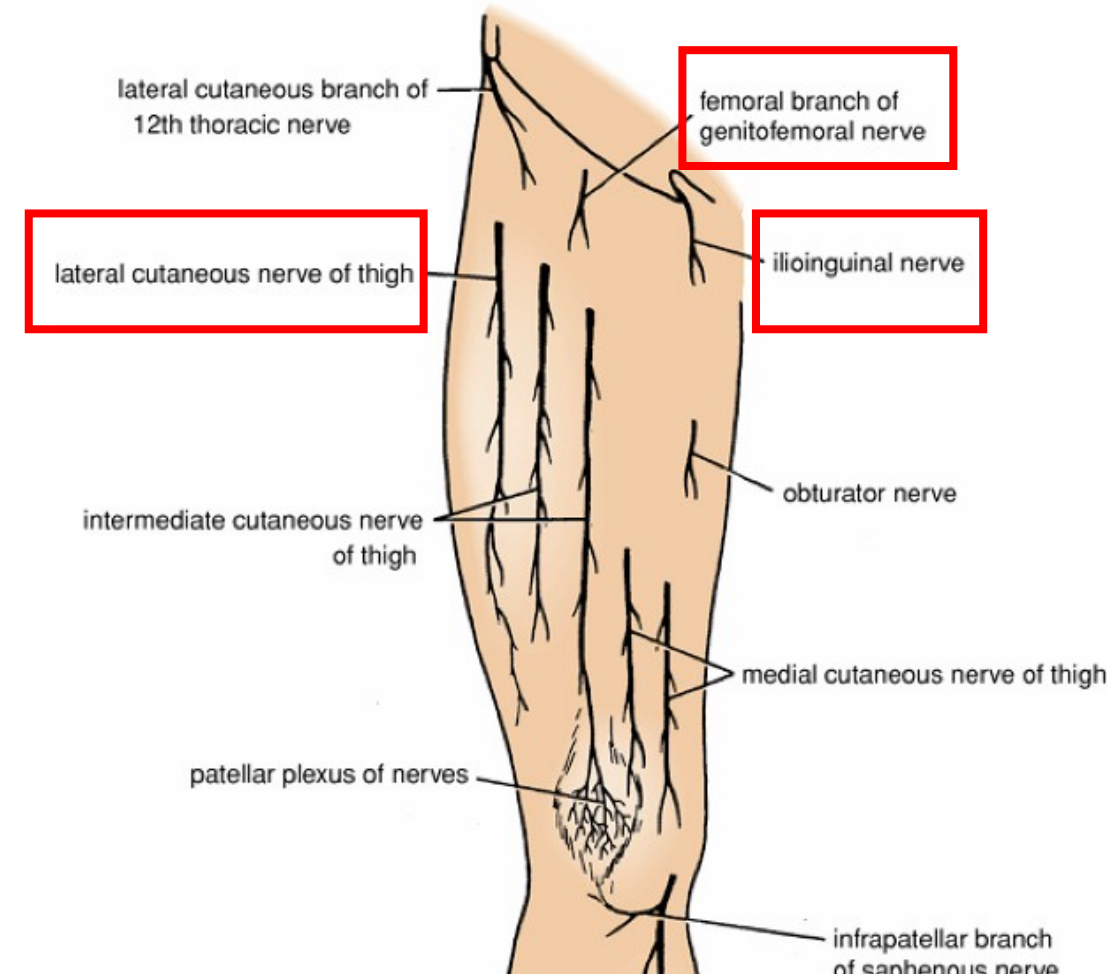
# Cutaneous innervation of front & medial side of thigh

## a) Branches from lumbar plexus:

**1-Ilioinguinal nerve (L1):**  
supplies an area below medial part of inguinal ligament.

**2-Femoral branch of genitofemoral nerve (L1,2):**  
supplies an area below middle part of inguinal ligament.

**3- lateral cutaneous nerve of the thigh (L2,3):** supplies the lateral side of the thigh and knee.





# Cutaneous innervation of front & medial side of thigh

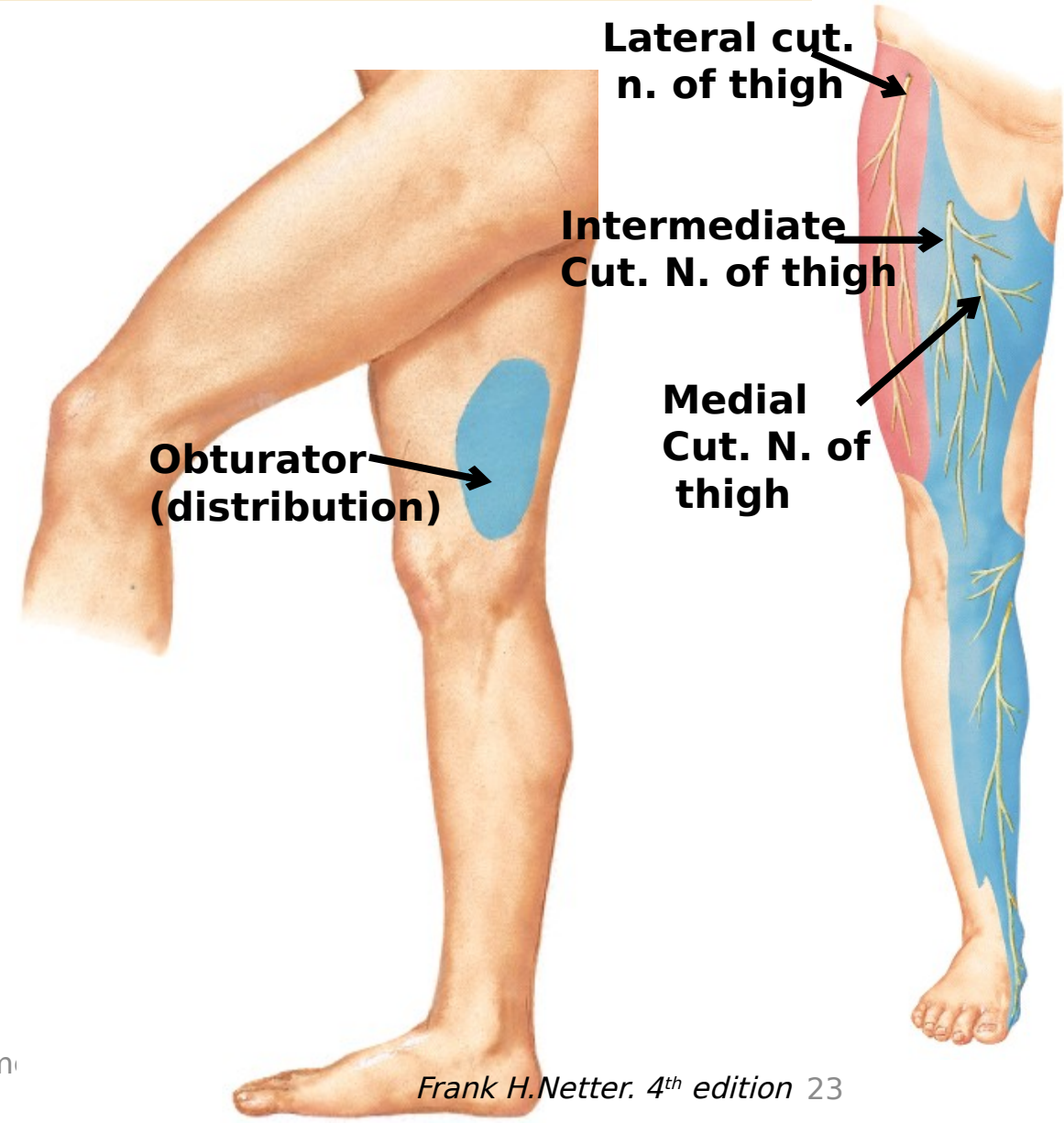
## b) Branches from femoral nerve:

**1-Medial cutaneous nerve of the thigh (L2,3):** supplies the medial side of the thigh.

**2- Intermediate cutaneous nerve of the thigh (L2,3):** supplies the front of the thigh.

**3- Saphenous nerve (L3,4):** supplies only at the medial side of the knee.

## c) A cutaneous branch from the anterior division of the



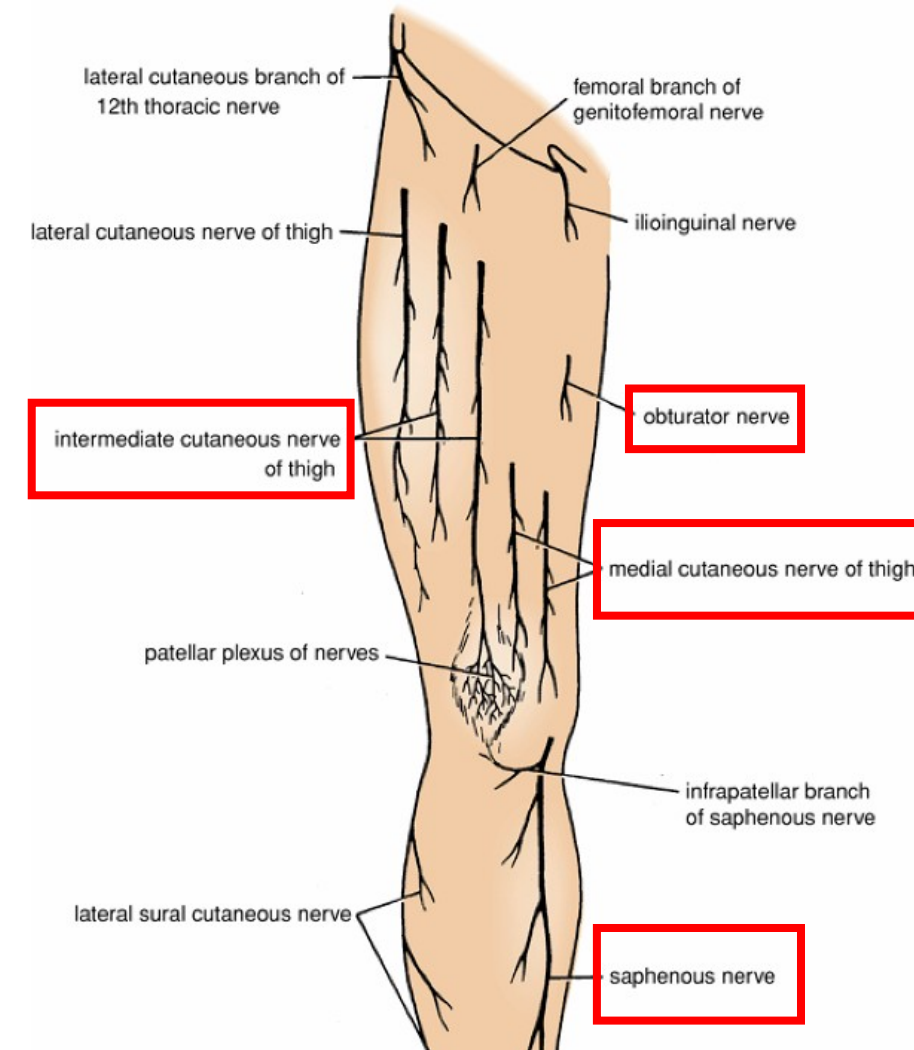
# Cutaneous innervation of front & medial side of thigh

## b) Branches from femoral nerve:

**1-Medial cutaneous nerve of the thigh (L2,3):** supplies the medial side of the thigh.

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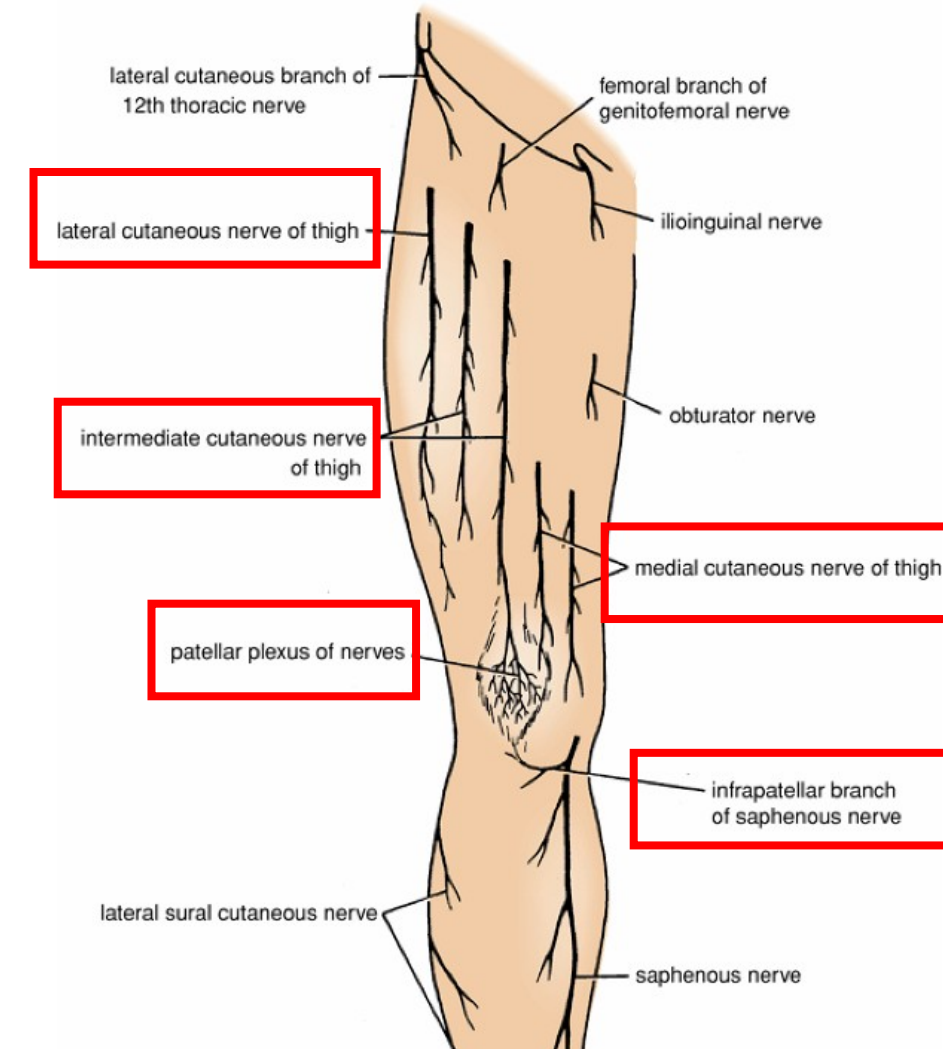
# Cutaneous innervation of patella



The skin in front of the patella and patellar ligament is supplied by patellar plexus which is formed of:

**1-The lateral, medial & intermediate cutaneous nerves of the thigh.**

**2-Infrapatellar branch of saphenous nerve.**

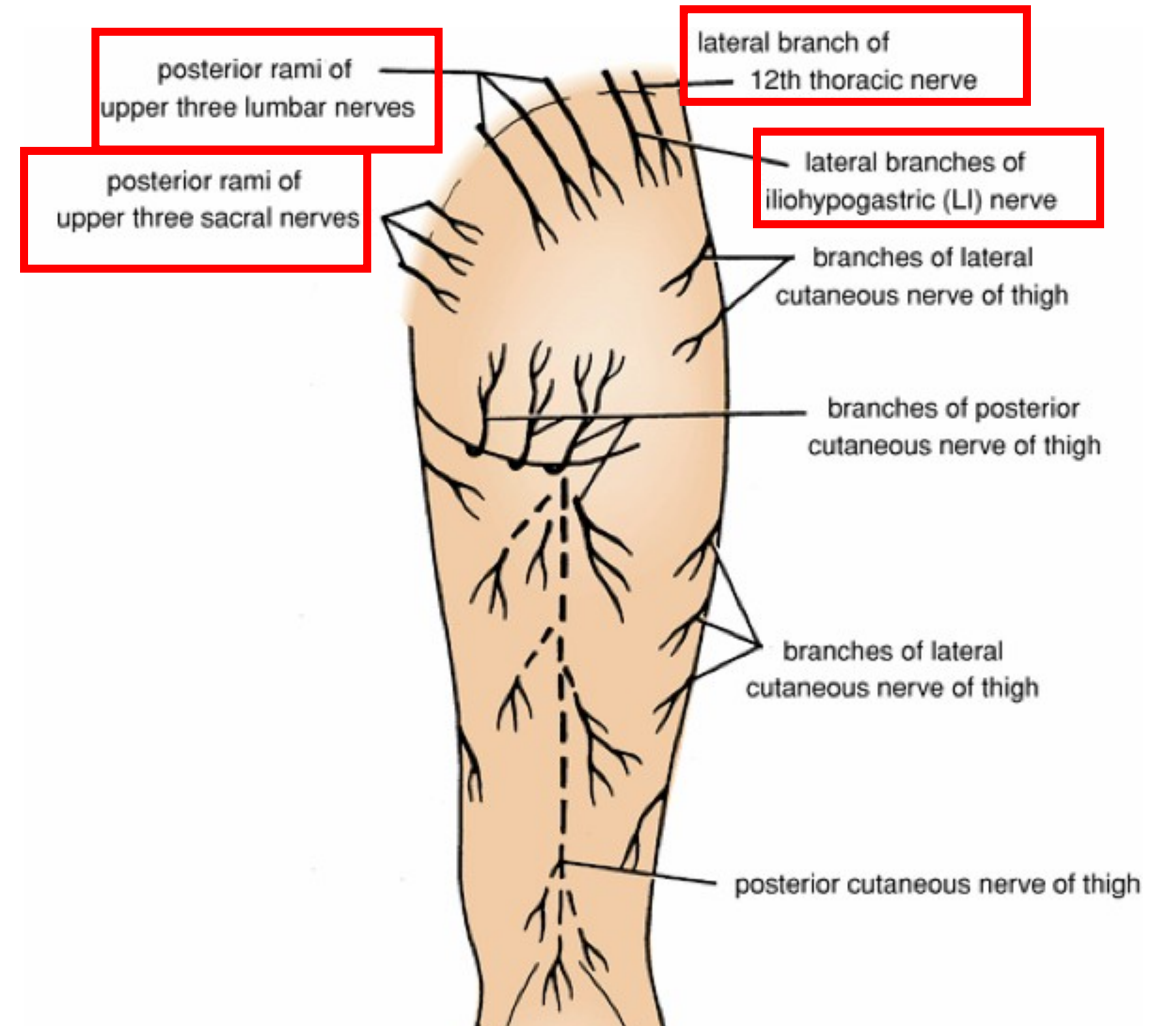


# Cutaneous innervation of gluteal region



**The upper and lateral part:**  
by lateral cutaneous branch of subcostal nerve (T12) and the Lateral cutaneous branch of iliohypogastric nerve (L1).

**The upper and medial part:**  
by branches of the dorsal rami of L1,2,3 and dorsal rami of S1,2,3.

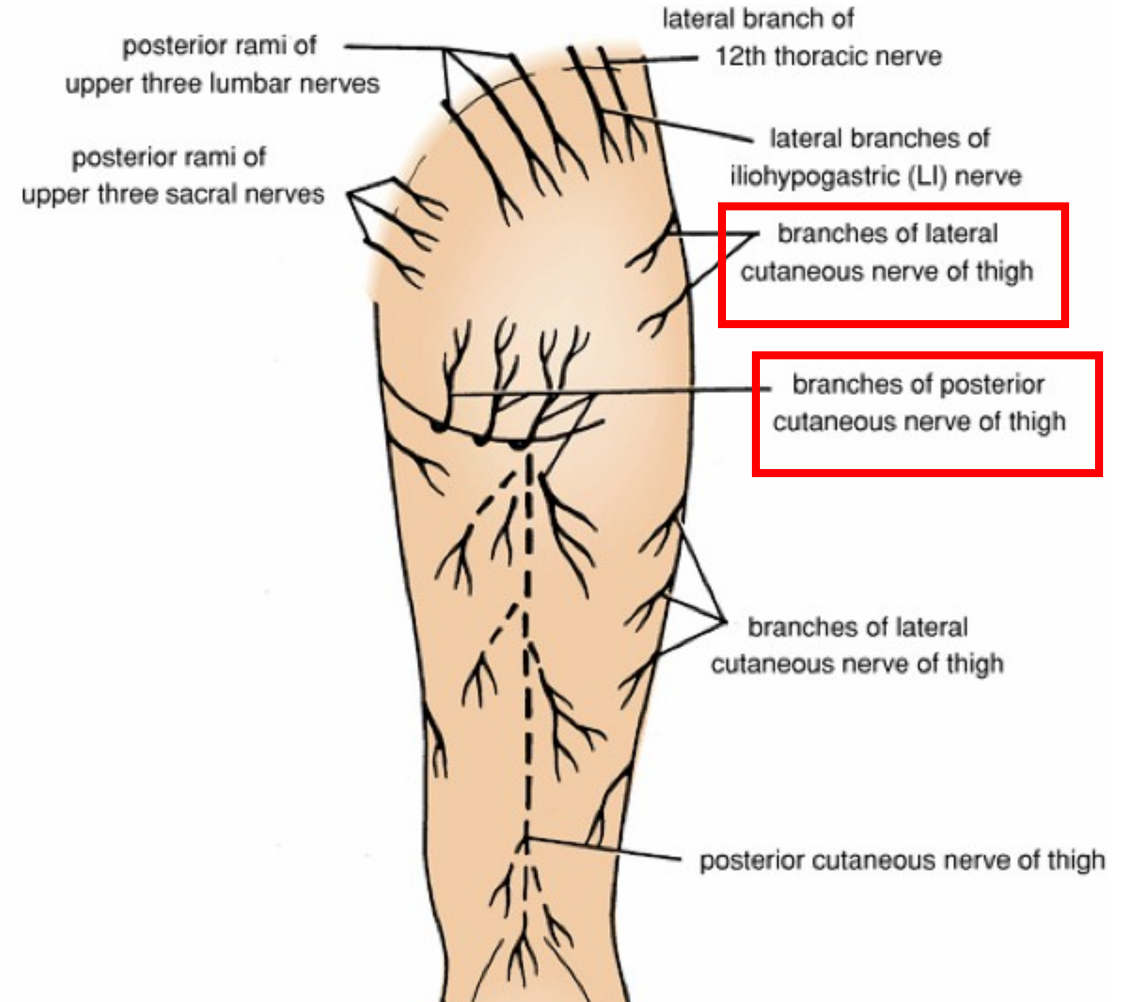


# Cutaneous innervation of gluteal region



**The lower and lateral part:**  
by the posterior branch of the **lateral cutaneous nerve of the thigh (L2,3).**

**The lower and medial part:**  
by gluteal branches of **posterior cutaneous nerve of the thigh (S1,2,3).**





# Cutaneous innervation of back of thigh



**Back of the thigh is divided into 3 vertical areas:**

**1) Lateral :** supplied by lateral cutaneous nerve of the thigh.

**2) Medial :** supplied by posterior branch of medial cutaneous nerve of the thigh.

**3) Middle :** supplied by posterior cutaneous nerve of the thigh.



*Clinical Anatomy by regions, Richard S. Snell, 9<sup>th</sup> edition*

## Lecture Quiz 2 (Cutaneous nerves)



1- Middle part of the front of thigh is supplied by.....while middle part of back of thigh is supplied by.....

2- Patella is supplied by.....

3- Obturator nerve supply the skin of .....



# Cutaneous innervation of front of leg

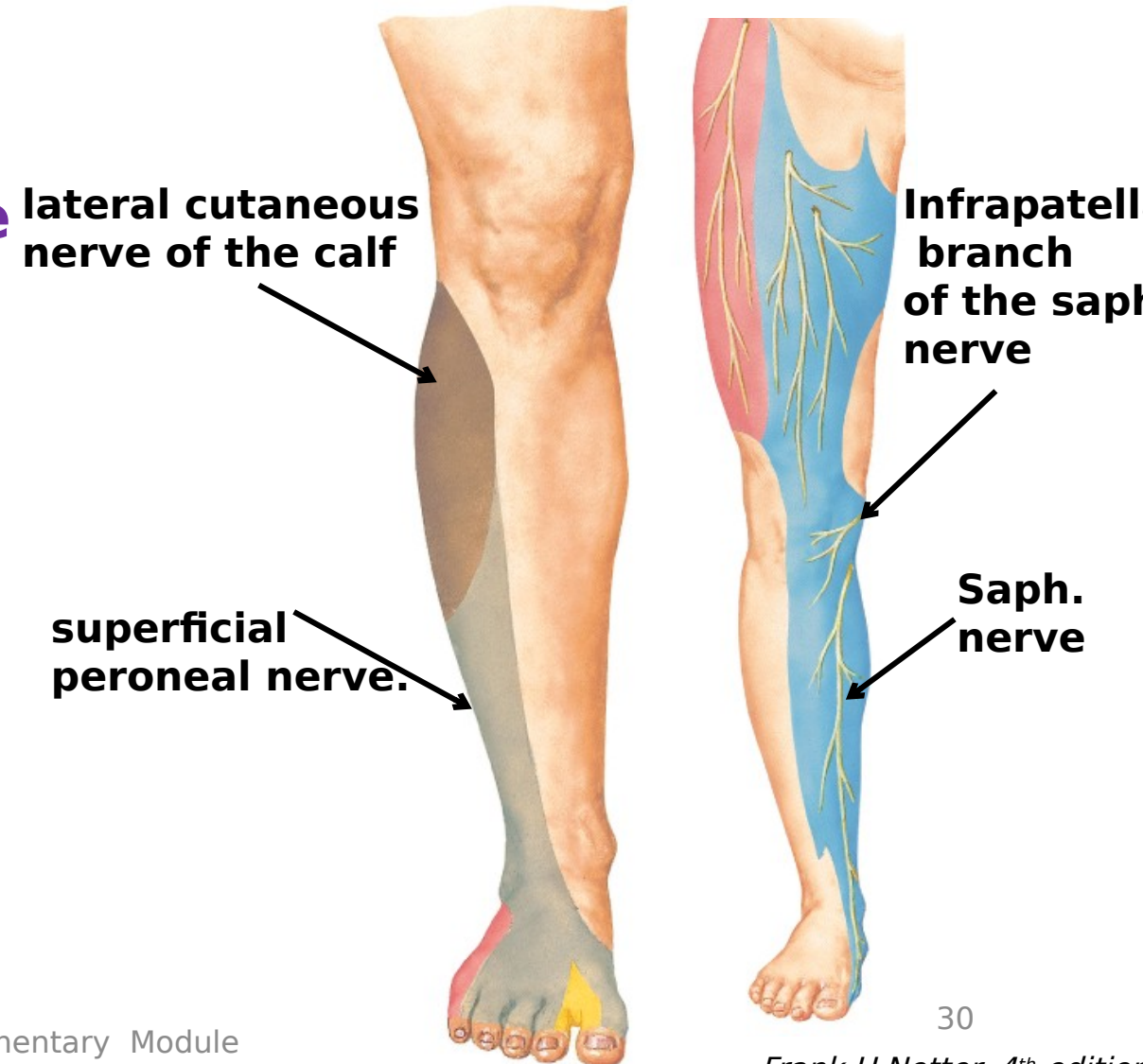


## **a) Medially:**

the upper most part is supplied by the **infrapatellar branch of the saphenous** nerve, while the rest is supplied by the **saphenous** nerve.

## **b) Laterally:**

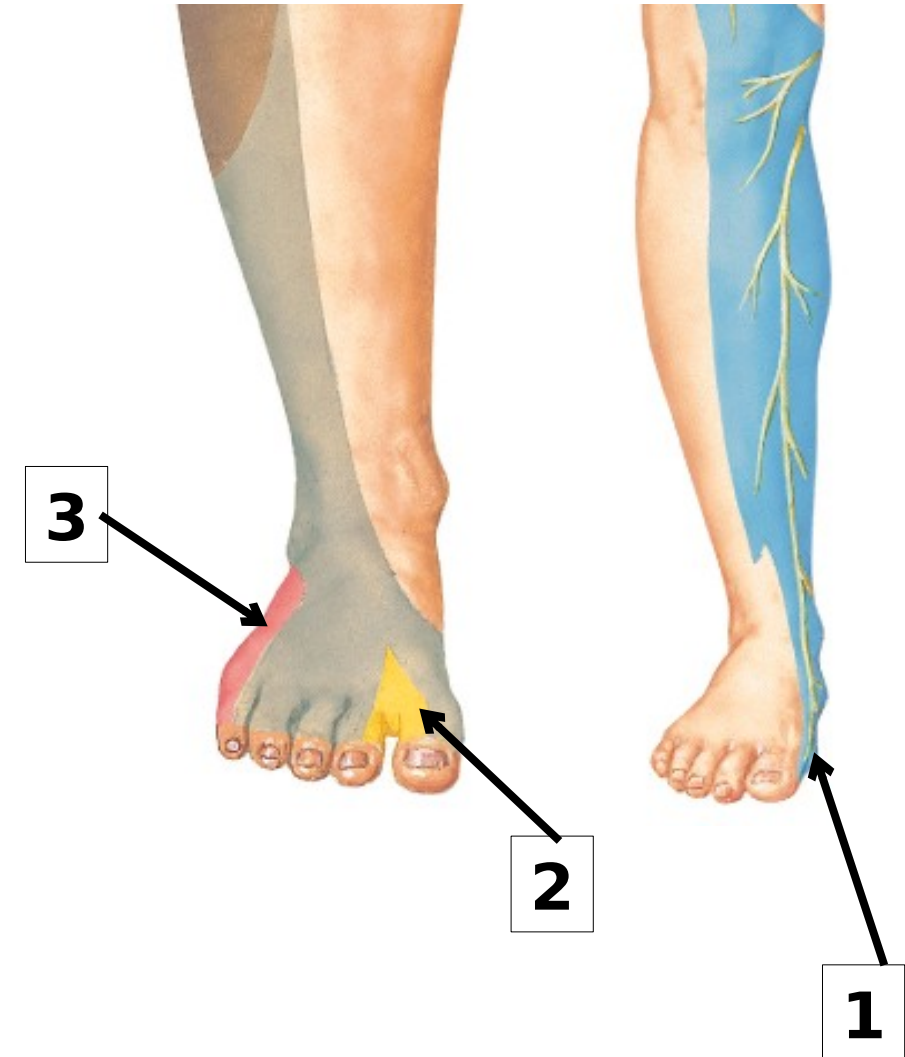
the upper 2/3 is supplied by **lateral cutaneous nerve of the calf**, while the lower 1/3 is supplied by the **superficial peroneal nerve**.



# Cutaneous innervation of dorsum of foot



- 1) The medial part to the root of the big toe is supplied by **saphenous nerve**.
- 2) The skin of the 1<sup>st</sup> web (between big toe & 2<sup>nd</sup> toe) is supplied by **deep peroneal nerve**.
- 3) The most lateral part to the lateral side of the little toe is supplied by **sural nerve**.



# Cutaneous innervation of dorsum of foot



4) The rest of the dorsum of the foot is supplied by superficial peroneal nerve.

5) The skin on the dorsum of the terminal phalanges is supplied by digital branches of medial and lateral plantar nerves.



# Cutaneous innervation of back of leg

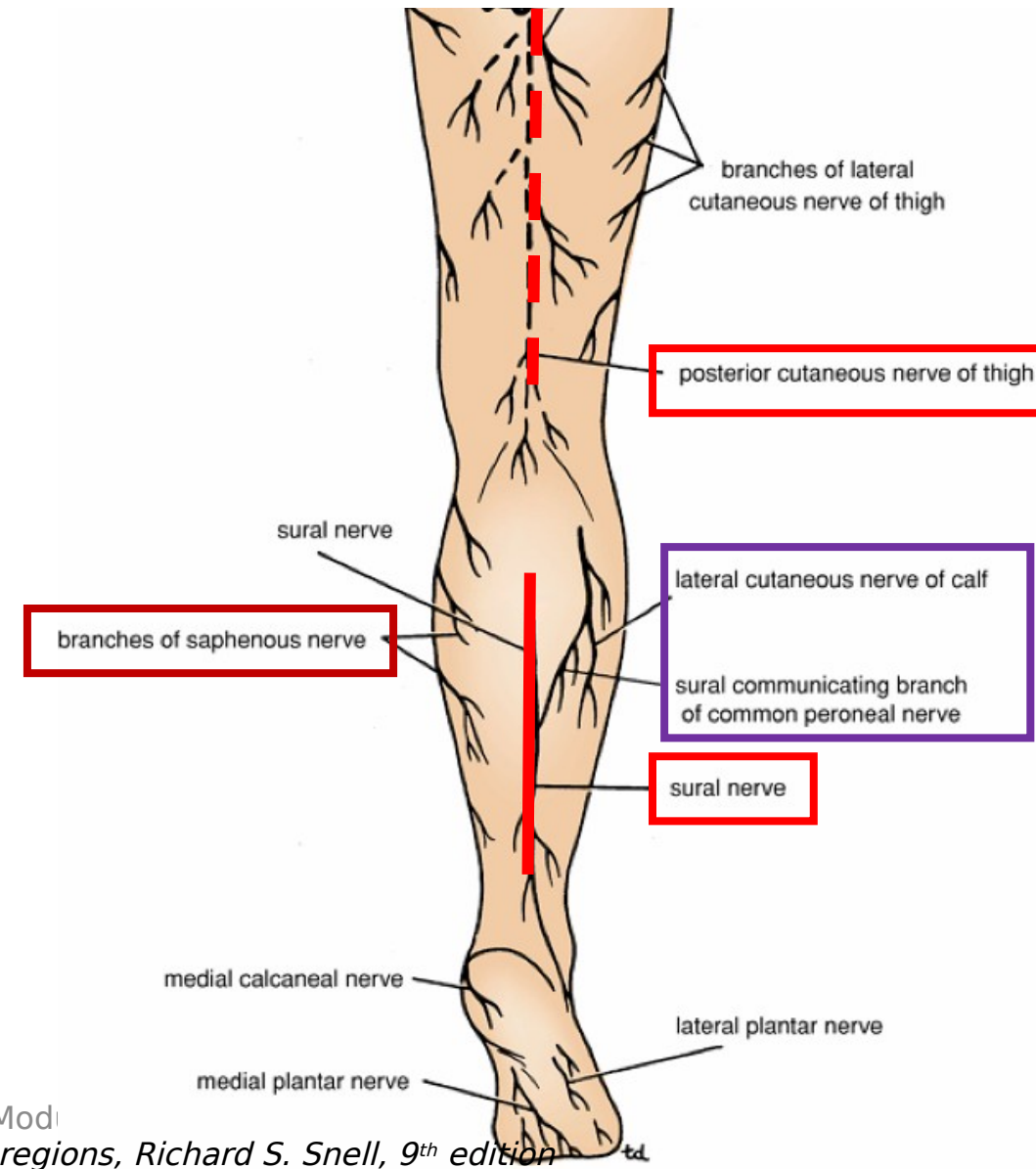


The back of leg is divided into 3 vertical areas.

a) Medial area **saphenous nerve**

b) Lateral area is supplied by **lateral cutaneous nerve of the calf**, **sural nerve** & **peroneal (sural)** communicating.

c) Central area is supplied by the **posterior cutaneous nerve of the thigh** & **sural** nerves.



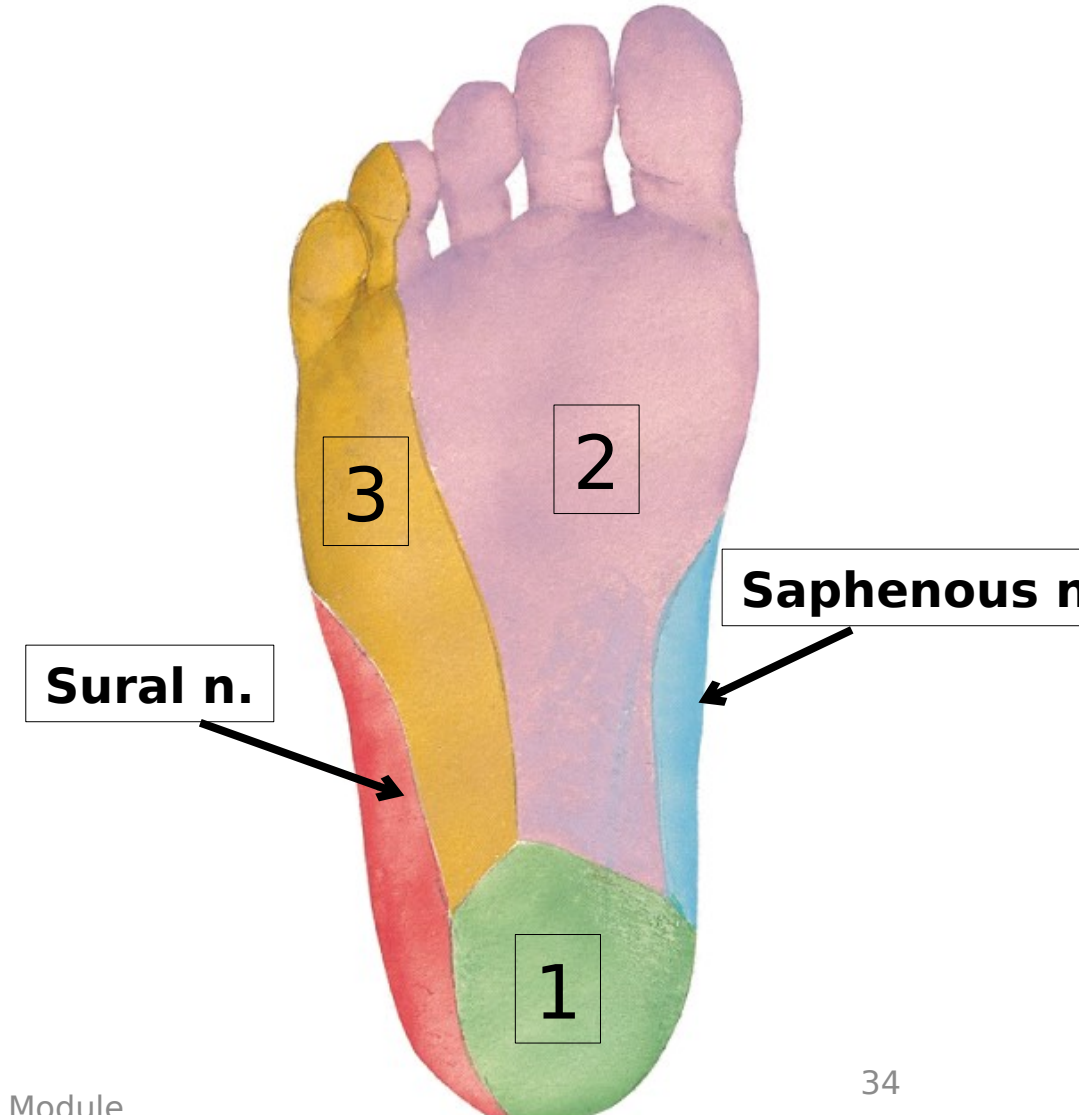
# Cutaneous innervation of sole of foot



1) The **heel** is supplied by the medial calcaneal branches of **tibial nerve**.

2) The **medial 2/3** of the sole & medial 3 ½ toes are supplied by **medial plantar nerve**.

3) The **lateral 1/3** of the sole & lateral 1 ½ toes are supplied by **lateral plantar nerve**.



## Lecture Quiz 3 (Cutaneous nerves)



1- Medial part of the big toe is supplied by.....while lateral part of the little toe is supplied by.....

2- Heel is supplied by.....

3- central part of back of leg is supplied by.....

## SUGGESTED TEXTBOOKS



1. Frank H. Netter Atlas of Human Anatomy, 4<sup>th</sup> edition.

Plates 481-482 & 544- 545.

2. Clinical Anatomy by regions, 9<sup>th</sup> edition . Richard s. Snell,

pages 368-369 & 551 – 552.



# Summary



- Segmental nerve supply of upper & lower limbs.
- Names of cutaneous nerves supplying arm, forearm & hand.
- Names of cutaneous nerves supplying thigh, gluteal region, leg & foot.



**Thank You**